R/D COMPUTING NEWSLETTER

Thankyou one & all. The response to date is quite overwhelming. News about a TI compatible computer has reached a great number of people all over the US and Canada. In this issue we are covering more of the features of the '99/128'. We are also including some exciting hackers tips to extend the capabilities of the 99/4A. Our understanding at this point is that beta test units will be available in the first week of March.

MICROpendium magazine this month had an editorial which deserves comment. The 'two approaches' mentioned regarding a replacement console OR some sort of dual processor peripheral/card to bridge the gap with say, IBM will no longer be a concern. I had looked at the Morning Star and Foundation cards when they were introduced. I must admit, CP/M is not really my favourite operating system. MS-DOS has become the defacto standard; but it also has it's drawbacks. None the less, this new computer will also have an option to add an 8088 card to the PEB! This means that 'todays' operating system, MS-DOS, can be used with the new computer. The current range of software being written for the IBM type compatibles can be tapped. WE believe that this factor just about covers it. Currently VERY few computers run at 18 megahertz. THIS WILL BLOW 'EM OUT OF THE WATER! The best of all three worlds is at your doorstep. TI compatibility, MS-DOS and SPEED

There WILL be new software. Already we have been contacted by expert 9988 assembly code programmers. With more memory and new high tech advances, programs can be developed that rival THE BEST on the market. Several programs will be introduced at the CES show in June.

Don't get me wrong, I use MS-DOS right now. I am familiar with 8 bit software/machines. Still, CP/M does not do justice to 16 bit technology. 8 bit programs on a "16" bit machine are SLOW...PLUS being cumbersome to use. Like I said before, this monster will outperform ANYTHING in its class - perhaps many computers considered to be beyond it. Couple THAT with an existing software base - with new packages coming out WITH the machine (Atari and Commodore, eat your hearts out): we forsee new frontiers being forged. Even the MAC has had real problems with many software packages coming out in the estimated time frames this past year.

Look to see extensive third party support in terms of hardware and programming. Keeping the creative and enthusiastic 'third party' out of a machine has killed more than one computer manufacturer. Many people believe this to be true with the 99/4A. Looks as if IBM is going to try the same. It will eat them alive impartially. Market forces are not entirely kind.

Before I forget, MICROpendium can be obtained by writing PO Box 1343, Round Rock, Texas 78680. Information about the TI is covered in depth. Mr. Koloen, the publisher contacted us about the new machine. We will be trading data over the next few months. I recommend this reading for all TI owners.

NEXT: If you are a programmer, we want to hear from you. Companies, publishers, manufacturers and/or freelancers etc. are all invited to submit products for the beta testing stage. All materials will be treated as proprietary & copy-righted by you,

with any and all further negotiations open in all respects. We would also like a release to include your specs, data, information, drawings and/or a review of your products/service for publication. Submit all materials with a release form to Bruce Ryan directly. For non-mailable items our UPS shipping address is L19 C4 Mountain Street, Haliburton. We do not accept any advertising at this point from commercial sources. SEE PG. 5.

USERS: Next issue we are starting a buy & sell column. This listing is free to owners who wish to sell or trade equipment only. No commercial listings will be placed. Only one notice per person per issue. Also, NO programs are to be listed, sold or traded (modules excepted). We do want other users to be able to take advantage of consoles, hardware or peripherals which you want to sell or trade. With a new machine coming out, people will be able to use the additional equipment that will become available to upgrade their present systems.

MORE SYSTEM FEATURES:
To retain hardware compatibility, the DSR routines have been kept. In the 99/4A the CRU bits were never fully decoded. Several areas were set aside as 'reserved' for future expansion - new console design etc. A programmable systems interface chip is used to access the 32 I/O lines available to move data from the console to the PEB, drives etc. CRU (communications register unit) bits are set to address these lines individually. This feature has allowed the new design to keep the interface connections virtually identical. At the same time, many new features have been designed in so the full power of the 9995 chip can be used. The design in the new computer

has been done somewhat differently, as the programmable systems interface unit was the ONLY chip that actually interfaced to the 9900 chip from the CRU. Thus, magic features like multitasking interrupts were frozen in the console ROM. This approach provided the limitations of the 4/A - regardless of what the CPU is capable of. Now we should see software capable of recalculating a large spreadsheet in short order while printing out another file, background mode tasks that can go directly to disk without stopping everything, letter printing and telecommunication functions all at once. The list goes on!

Add that to the 128k-512k-1 Mb of memory and dual processors! THIS is the computer that TI 'SHOULD' have developed & introduced in 1983.

LETTERS:
Gentlemen:

I am extremely interested in all the additional details.

A question I have wanted to raise wtih one of the concerns trying to build a TMS 9900-family computer to keep this interesting and unusual system alive is: why not configure a current, compatible 9900-series processor as an insert card for the PEB, or as the heart of a new peripheral expansion device? Early designs for do-it-yourself TMS 9900 computers used bank switching to allow accessing more than 1 MB of RAM, and I would think 256k or so would be more than enough. It might even be possible to design such a card that would allow connecting several 99/4A's to this card, using them as terminals and allowing multi-user operation.

It does seem to me that, given the short-sighted faddishness of computer dealers and the terribly fragmented nature of communications in the 99/4A world, the developer of a successor system is going to have an uphill struggle. For a year and a half now, there have been rumours that someone or another (two guys in West Virginia - CorComp - a guy in Florida - Data General...) was planning a 99/4A work-alike. I almost think that a kit fetched board, microprocessors, ROMs) might be the best way to start, as it would keep production costs to a minimum. I rather hope not, as I'm a very poor kit-builder.

- Timothy Sanford, New York

Timothy, You're right on several counts. The state of the TI world is fragmented - which is the reason for starting a newsletter based on the information about this very real & operational machine. We've heard the rumours too. Checking them has never turned up any machine that was actually running. The kit approach is tremendously complex - have you ever looked inside your 99/4A? Having a great deal of experience building electronic gadgets, computers are better coming off the line. We hope to reach many retail dealers and users groups over the next few months.

NEW RUMOURS:
Two different companies (apparently) in California are working on RAM disk cards for the PEB. Various options are reported to be available to work as another 32k memory expansion and a disk controller emulator to allow another 256k of RAM to be configured as a electronic disk. As the information is somewhat contradictory, we will keep you posted.

Several new products are in the wings right now. We hope that these actually become realities. If TI's approach had been more 'Apple or IBM' like, we would have seen these sort of products enter the market in 1981-82 rather than this late stage. We understand that an internal modem card, a mouse & software package is being developed, real-time clock card, 8088 coprocessor for the PEB and new telecommunications programs/ firmware are all on the drawing boards heading for release.

TI USERS GROUPS:
The market fragmentation mentioned previously is a very real problem in the TI world. We have the names & addresses of some 335 TI users groups - both recognized and not. If you know of any groups that are NOT LISTED BY TEXAS INSTRUMENTS, do everyone a favour and put them in touch with us regarding these developments. The same is true of retailers who now carry or used to carry TI products. We would like to see a strong retailer base set up for new products to provide better direct access to equipment and soft ware. Many people have expressed concern about having only mail-order sources available. Many people would rather purchase products from a retail source so that they can use and examine the

features before making a purchase - low price not withstanding. We would appreciate feedback on this subject. A price war through mail-order houses being started immediately will not benefit 99/4A users who wish to see the new computer continue with strong users support for their machines.

Another concern raised has been that of communications through various users groups. THIS IS WHY WE OFFER REPRINT RIGHTS IN EXCHANGE TO ALL GROUPS. We are more concerned about accurate user response for market research. Understand that there ARE costs involved in doing this - which is why we offer a subscription. We DO NOT REQUIRE groups to subscribe. Those who wish to receive EXTRA information every month are invited to subscribe.

NEW PRODUCTS:
MYARC has a new expansion unit for the 99/4A. This unit adds 32k, an RS-232 interface (with two serial & one parallel port), their double- sided double-density disk controller and your choice of one or two disk drives. These drives can be either single or double sided for 183k or 368k storage PER drive.

These units are cost effective in comparison to original TI equipment with the added advantage of more disk storage and improved RS-232 features. Another option is a 4 ft. cable so the unit can be located on your desk away from your computer. In addition, the RS-232 port has been improved with maximum baud rate of 19200 (twice that of TI's) and the parallel port has been changed/ redesigned to conform to Centronics compatible I/O. An inverted input option provides additional advanced flexibility as well! The DS/DD disk controller allows up to four drives to be used: single or double-sided, single or double-density. Operates at standard 28ms and the faster 6ms track-to-track access time for the new faster drives. You can set the head seek time for faster loading & saving of files. In addition, a new command from console or X-Basic will give you a directory listing - with out all the Disk Manager II routine of switching modules! Assembly code can be loaded & run using the cards features. The card is shipped with the Disk Manager II. When the DM II supply runs out, a new disk based management program will be used.

PRICES: Valid until March 21st
MPES/58-1 (one DD/SS drive) $589.00
MPES/58-2 (TWO " drives) 778.00
DOUBLE-SIDED DRIVE OPTION each 45.00
Attached cable option (4ft.) 45.00

ALL PRICES ARE IN US FUNDS: CALL FOR
CANADIAN QUOTES. UNITS ARE SHIPPED
FROM RYTE DATA or OUR US SHIPPER.

Shipping and insurance: UPS delivery in
the US are $28.00 per unit. Volume
discounts are available to groups or
retailers.

Myarc has also developed a brand new
32/128k memory expansion card for the
PEB. This card is designed to function
as a RAM disk with a PRINT SPOOLER.
Features that will allow longer
printouts to be fed to your printer and
not hold up what you are doing.
Availability and price has not yet been
announced. We will report on this new
advance in the next issue.

CorComp is now shipping their 9900
Expansion System in quantity. With
their new quality control systems, and
exhaustive beta testing, these units
also provide cost effective expansion
for TI owners. Several new products
are in the works at CorComp:
announcements will follow as they are
released. Although their 99000
COMPUTER is presently on hold, plans
are to follow through with the
extensive development and investment
required to bring a new machine to
market. We applaud their visionary
efforts - competition and new machines
are ALWAYS good for all users AND
support companies. During the next few
months, we are working to assist
CorComp in reaching their objective
with their computer. We are also
helping them reach the Canadian market
with support, hardware and software.
DEALER INQUIRIES ARE INVITED.

TECH NOTES:

A fellow user has sent this article
about adding 8k of RAM to the E/A
module! This is from New Horizons users
group: Randy Gries and John Clulow.
Excellent work guys!
Questions may be directed to Ron at
(419) 874-1414. Later a circuit to
have battery backup will be printed.
This is especially useful for E/A
programming. NO RESPONSIBILITY CAN BE
TAKEN FOR ANY LOSS OR DAMAGE YOU
INFLICT. ATTEMPT THIS AT YOUR OWN

RISK. The memory used is either the
Hitachi CMOS HM6264P-15 ($34.95) or the
LP-15 version ($39.95) if you want
battery backup later on. These chips
are available from JDR Micro- devices,
1224 S. Bascom Ave., San Jose, CA
95128 (800)538-5000. You also need a
TI game module which is foiled on both
sides. MunchMan was used for this one
(purchased cheap).
You will need an Editor Assembler
module to transplant the E/A GROM chip.
A "spare" is a good idea, in case you
destroy the chip! Buy a 1k resistor
(R.S.# 271-023) and some wire wrap
(#278-501). Vacuum solder remover,
rosin core solder and a GROUNDED
soldering iron (pencil) are also
needed. If you have no experience
handling CMOS devices and removing
components, ASK FOR HELP.
First unscrew the game module shell,
pull the case apart from the slotted
side. Remove the PC board while
holding the sliding door down. Note
the spring is under the PC board.
NEXT: unsolder and remove the GROM and
ROM chips. They are located as shown.
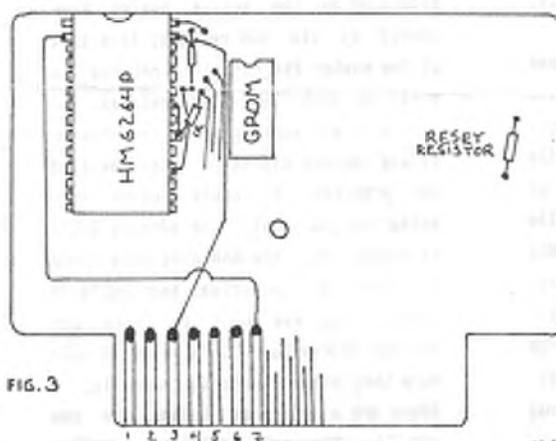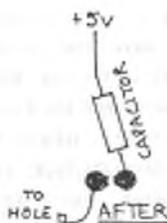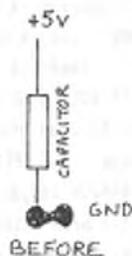The ROM chip is the larger of the two.
SEE Figure 3 below:

FIG.3

NOTE FIG.3
RAM pin 2 is wired #7 edge
line. 1K resistor is wired to
pin 20 and 22. Line from
capacitor to pin 18 does
NOT connect to resistor.

FIG. 2

Heat each solder connection on the
underside of the board and use the
vacuum device to remove most of the
solder. Gently pry up on one end of
the chip while heating pins on the
underside of the board at the same
time. (HINT: a rubber band set up to
PULL on the chip for you can help).
A capacitor should be located next to
pins 21-24 of the ROM. Desolder the
ground end from its soldering pad,
leaving the +5V end (nearest the back
of the board (away from the edge pins))
attached. With a knife, carefully
break the foil between the two adjacent
soldering pads where the capacitor was
connected as shown below in Fig. 2:
Now resolder the ground end of the
capacitor to the pad on the RIGHT.
Solder one end of a short piece of wire
to the pad on the LEFT (where the
capacitor used to be) and the other end
to hole 18 of the removed ROM. See FIG
1 below for ROM pin numbering.

HM6264P (U) -15 (larger) FIG.1
superimposed on ROM IC
NOTE: ROM shown as narrow for
clarity only.

This will be the seventh hole from the
BACK of the board on the side CLOSEST
to the capacitor.
When a command module is inserted, it
normally resets the computer. If you
want to disable this auto-reset in your
E/A module, remove the resistor at the
opposite end of the board. See Fig. 3
above.
Figure 1 gives a pin diagram of the
HM6264 RAM with a typical 4K ROM
superimposed. Note the ACTUAL width of
the chips is identical, but the RAM is
LONGER. The ROM is drawn narrower for
clarity in showing corresponding pin
numbers. In the following, all pin
numbers will be preceded with "ROM" or
"RAM" to indicate which devices are
involved.

3

In handling the CMOS RAM chip take EXTRA precautions to eliminate static electricity. Don't work on a carpet, touch a ground before handling the device, handle it by the plastic body, touch the pins as little as possible and work on a grounded surface if possible. When soldering, hold the pencil iron on the pins for the LEAST amount of time required to make the connection -- not more than 1 to 2 seconds. If you clean the pins first, it helps. Remove the RAM from its anti-static tube. Place the device on its side on a table (hard, flat surface) and move the body of the device to very gently bend the pins to closer to right angle with respect to the body. Do both rows of pins. Check to make sure that the pins line up with the holes on the PC board. Orient the chip as in Fig. 1 and bend RAM pins 1 2 28 27 & 28 straight out. This allows the chip to fit the OLD holes. Insert the RAM into the PC board so that the notched end is flush with the back of the board. RAM pin 3 goes into RUN hole 1, RAM pin 26 into ROM hole 24, etc. etc.

With the RAM in place, solder in one pin on each side to hold it. Connect a wire from RAM pin 27 (now bent straight out) to the Write Enable pin on the edge connector. It is the third on from the left looking at the top of the board (see Fig. 3) and it is NOT connected by foil to the PC board. Connect a wire from RAM pin 2 (also bent) to Address line 12 on the edge card connector (7th pin from the left. This edge pin also doesn't have a foil connection to the board.

Solder a short wire from RAM pin 28 (bent out) to RAM pin 22. It will be relativiely easy to solder one end of the wire to RAM pins 28, but RAM pin 22 is in a hole and a little more difficult to get at. Solder the wire as close to the board as posible using as little solder as feasible. Solder one lead of the 1K resistor to the soldering pad just above and to the right of the ground end of the capacitor. (Refer to Fig. 3). The resistor lead can be pushed through the hole. Solder the other end of the resistor lead to RAM pin 28 (bent out). Solder a short wire from the soldering pad to the right of the +5V end of the capacitor to RAM pin 28 (bent out).

Now all that remains is to install the E/A GROM. Open the E/A module and remove the PC board. Unsolder the GROM chip using the same sort of procedure as above. Place the E/A GROM on the new board in the holes left by the old GROM. Notched end goes towards the back of the board as well.

Finally, solder all the IC pins in their respective pads for both the RAM and GROM. Place the spring in the BOTTOM of the E/A module case, locate the sliding door properly, put the new PC board in place and snap the case closed. Replace screw and you're done. The first thing to do is make sure your E/A GROM still works OK. Then you can test out your RAM with the following program:
100 INPUT "NUMBER 0-255? ":X
110 CALL LOAD(24576,X)
120 CALL PEEK(24576,X)
130 PRINT "MEMORY HAS ";X
140 PRINT
150 GOTO 100

When you enter a number from 0 to 255, you should see the same number displayed on the screen having been stored by 110 and reead by line 120. If the number the computer returns is different from the one you entered, the device is not working properly. Remove it and retrace all steps until you find the problem. I would check the soldering job first. The address 24576 is >6000. Your new RAM goes from >6000 to >7FFF or in decimal from 24576 to 32767. You may want to check out several addresses in this range to make sure they are all working correctly. There are a number of things you can use the new RAM for. In assembly language programs you can use an AORG >6000 directive to have the loader place your object code in the new RAM. Alternatively, you can change the First Free Address in High Memory (FFAH) to >6000 with a CALL LOAD(8228,96,0) and then load 1 program w/ CALL LOAD("DSK1.NAME") as usual. If you plan to load other programs, you can change the FFAH to >A000 by CALL LOAD(8228,160,0).

I have been using the new 8K of RAM to hold the DEBUG program when working on assembly language programs.

An article by Jon Bannister of 9T9 users group in Toronto described a modification to the bus lines found in the speech synthesizer to utilize (by grounding) the

LOAD interrupt line on the 44 pin I/O. This is similar to Bill Gronos' GROM BUSTER with the switch debounced through hardware - rather than software. This causes the computer to do a BLWP to vector >FFFC where >FFFC contains the Workspace Pointer and >FFFE the Program Counter. So at any time in the execution of a program (like when it inevitably locks up) I press the button and branch to the debugger. Jon's device is pretty easy to make. You need a momentary contact, normally open push button switch (Radio Shack #275-1547), a .1 mF bypass capacitor (#272-135) and a 2.2K resistor (271- 1325). Solder the capacitor across the switch keeping the leads as short as possible. Solder one lead of the resistor to one side of the switch and the other lead to a 7" insulated wire. Connect the other end of the wire to LOAD pin on the speech synthesizer. This is pin 13 on the I/O buss. Looking at the edge of the card at the upper right of the console, pin 13 is the seventh pin from the left on the bottom. Flip the board upside down so that you cannot see any components and place the black female connector on the right side. Pin 13 LOAD is then seventh from the bottom.

A second 7 inch insulated wire should be soldered to the other side of the switch and then to Ground - leads 11 12 13 and 14 from the bottom (with the black connector on the right). You can easily recognize them because they are all soldered together.

All that remains is to mount the switch inside the speech synthesizer under the hood. You'll need a 5/16th in. hole for the Radio Shack switch.

Now, if you've made it this far, put in your E/A module, connect the modified Speech Synthesizer. Place the E/A disk with DEBUG on it in drive #1 and run the following program:
100 CALL INIT
110 CALL LOAD(8228,96,0)
120 CALL LOAD("DSK1.DEBUG")
130 CALL LOAD(-4,131,224,112,198)
140 CALL LOAD(8228,160,0)
150 PRINT "PRESS @ THEN ENTER"
160 CALL LINK("DEBUG")
170 END

This will load the DEBUG utility. Now enter BYE to leave basic and select an option of Editor Assembler - e.g.: Load and Run. When you press the LOAD button on your speech synthesizer you should be in the debugger. To leave the debugger, use FCTN QUIT.

LETTERS 2:

Dear Bruce,

I had the same idea... replacing the ROM chips with a custom program and driving it off the RESET interupt. I even bought a console just for this purpose. I have an EPROM burner that lets me make my own modules, but the system ROMs are a different configuration than the 2764 EPROMs that my blank modules use, so I couldn't just burn a new operating system and solder it in.

A standard ROM/GROM header is the first section of various memory areas and is identified by the first byte being 'AA'. This can be a location in GROM, a module in ROM, or a peripheral ROM. It contains pointers to specialized programs and subroutines. One of these is a power up routine. It will be executed before the title screen is displayed and is executed as part of the RESET interupt. You can seize control of the computer without having to hand it back to the remainder of the RESET routine.

The bad part is that the module ROM is not checked for power up routines. But if you put a ROM on the main I/O port as if it were a peripheral, then you can do what you want.

Another idea I had was to tie the pins of the system ROM that contains 0000 & 0002 to the high and low side of the input power as needed to create an address that would be in the module ROM. It would then be simple matter to burn a custom module that would execute on RESET.

I haven't done much with my computer since the TI bubble burst...I dropped one of my major projects in mid stream: analyzing the disk operaton so that I could write my own disk controller program. I wanted to bypass having to dump the data into the VDP RAM and instead put it directly into CPU RAM. I expected a big decrease in disk access time that would speed up the handling of large amounts of data...

I would love to write a hacker's book on the 99/4, but I just don't think the money is there to justify the time. It's a lot of fun to explore the secrets of the TI, but boring as hell to write them out in detail--too much like real work. Still, I had a lot of fun while it lasted, met a lot of interesting people, laughed a lot, got excited when I discovered something new about the computer interworkings...

Keep in touch,

Bill Gronos

Midwest City, OK

Well folks, how about it? Is there life after the bubble? Personally I believe that a hackers book would be invaluable - plus a running start at the '99/128' AND keeping our 4A's quite usefull. This letter was in response to my questions/ideas about using a system running in a psuedo 'background' mode for monitoring & control systems.

Dear Ryte Data,

I was delighted to read your message on the Source about the new TI compatible computer. An upgrade to the TI 99/4A is indeed what the TI community has been waiting for. The 99/8 was supposed to be quite a machine, and this is even better? I can't wait to hear more. I hope it will be compatible with existing TI soft/hardware and can be sold at a reasonable price.

I suggest you leave some messages on the TI forum on Compuserve. There are many SERIOUS TI users there, who have also been waiting and wishing for an upgrade machine. Many members know the /4A inside and out, and can give you excellent feedback on the new machine...

D.V. Samzone, Waterbury, CT

Domenic, You're right! The total response is excellent. We don't, unfortunately, subscribe to Compu serve - but the grapevine has done this for us. Please, feel free to pass the word!

ATTENTION:

In our latest contact with the system developers, they have informed us the "word is out" with many TI users. This is resulting in TOO MANY CALLS to their offices. We are told that this is interfering with the WORK that needs to be done. PLEASE, DO NOT ADD TO THE BURDEN. IT WILL result in a real delay in bringing the new computer out for the projected release date. Period. Some users believe that there is too much secrecy involved -- it is mere pragmatism. It is one thing to be a solitary enthusiast and QUITE another to be developing microcode, system details, interface problem solving and gearing up for full commercial manufacturing. PLUS being expensive.

Rest assured that we will keep you fully informed over the course of the next issues.

NEXT PHASE:

Each issue will be larger than the previous. As inquiries are coming in daily, we are very interested in providing

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service to all TI owners. We cannot stress the importance of a "head count" enough. It is not enough to imagine that there is a market - only research will determine the actuality. If you know other TI users who are interested, have them drop us a note. Subscription prices are $7.88 for issues 1-7. Additional magazine information will be included at a later date.

BAD RUMOURS:

Canada Post is subjecting us to a strike as of MARCH 8th. We have made arrangements for continued service through an independent mail firm in Canada. For US customers - OUR US MAILING ADDRESS WILL BE 28 STARBOARD WAY, LATHAM, NEW YORK 12110 USA. The phone will remain the same throughout. Canadian customers can WIRE us at the Bank of Commerce, Haliburton K0M 1S0 c/o Ryte Data. We can also be reached at SOURCE ID: TI 8678. All US inquiries and orders can be placed through the N.Y. address for the strike 'duration' - don't you just love the Postal 'Service'...

FOUNDATION NEWS:

Foundation Computing has informed us that they are 'on the verge' of releasing a ONE-PASS disk backup package which works with their 128k card. This is the second software program available commercially that we know of...are there ANY others? The uses of the 128k card ARE quite impressive - having more would be very nice! Foundation plans to let people know about several user developed programs. If you know of such, have them contact Foundation so that 128k card owners can make better use of their investment!

We had found that some of the new beige consoles would panic when faced with a 128k card. One of our 4A's obstinately refused to work. Foundation found that one of TI's parting shots was to release a batch of consoles with timing differences that caused this incompatibility. They have fixed this bug with an Engineering Change which is being applied to all 128k units. Not to worry, you can have your card retrofitted to work with an odd beige console. Nice work all in all. Suppose a review is in order!